Cloud Computing and Data Center Consolidation

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Agenda

- State of Nevada Current Context
- SAIC's Journey to Cloud Computing
- Top Data Center Consolidation Project Management Lessons Learned
- Top Data Center Consolidation Technical Lessons Learned
- Top Security Considerations for Cloud Computing
- Cloud Governance Framework
- Top Workload Considerations
- SAIC's next Journey
- Notional Roadmap
- Amazon Web Services State and Local Use-Cases
- AWS' Keys to Successful Cloud Adoption

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REVISED DATE: 08/12/2012

ORIGINATING COMMITTEE: ITAB

Advisory Recommendations 2013

The ITAB board believes EITS should have three primary goals regarding IT services:

- **(1) Provide continuity of services with a framework that allows the State to grow and improve;**
  - The State has determined that in accordance with NRS 242, based on continuing due diligence, the observation and recommendations derived from the ITAB Board, the Technical Strategic Planning Committee and National trends, *the practical "Consolidation" of infrastructure and systems resulting in tax dollars savings, the modernization of business applications and the standardization of security administration is essential and, to some level, inevitable.*

- **(2) Normalize the security of its' environment including processes that ensure it keeps pace with threats**
  - Create an IT Strategy and or ISMS (Information Security Management System) via an appropriate adopted framework for the State of Nevada. Centralize all IT Security and Internal Control functions under the CIO and ensure that the Enterprise Architecture strategy includes "Security by design" for all systems/solutions.

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Advisory Recommendations 2013 (cont'd)

- **(3) Improve the efficiency of the IT environment through consolidation, improved governance, standardization and other methods to provide Citizens and State agencies with the next generation of services.**

Additional Recommendations:

- **(4) Application Modernization/Life Cycle Management**
  - Implement a DevOps suite of tools for automating release management from development through operations, and enable EITS to support large-scale Agile development efforts with frequent release cycles.
- **(5) Citizen Enablement/Mobility**
  - Select and implement a common Mobile Application Development Platform (MADP) for developing mobile Web-based applications (non-native), and develop a single, citizen-facing application for all agencies.

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SAIC's Journey to Cloud Computing

- It starts with the business.
  - SAIC wanted to find out how modern virtualization technology can translate to a new kind of agility for a company of their size and scope.

- How could…
  - A data center build → become a cornerstone of an enterprise cloud.
  - An IT forklift integration → be accelerated by virtualization.
  - IT virtualization → make a strategic difference for the business.
  - Enhance governance → while being more responsive.

- Our answer:
  - Move everything to a cloud computing infrastructure.

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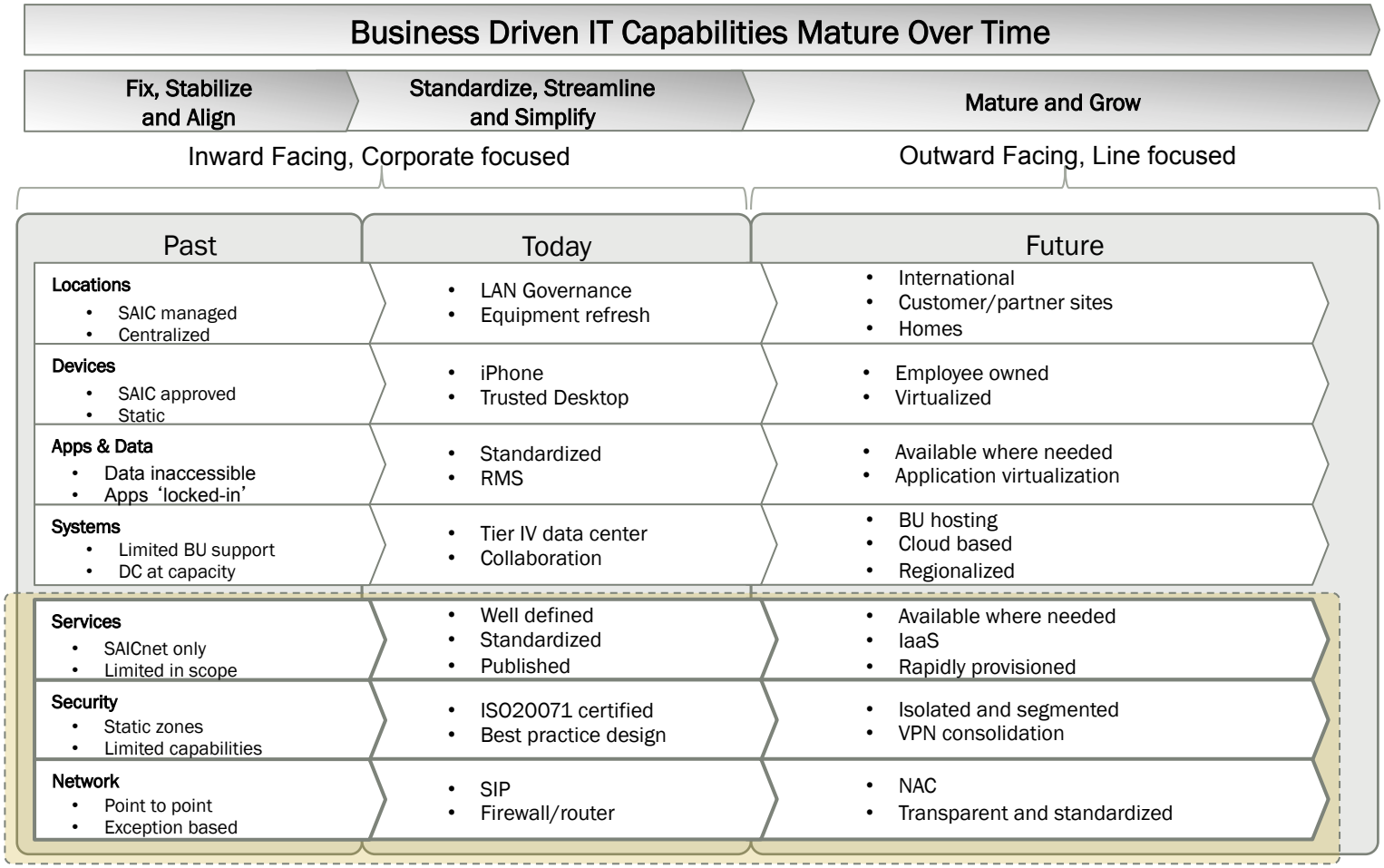
Journey 1: The "Back Office" (Duration: 36 Months)

Targeted savings and improved service required a simplified applications stack, more infrastructure outsourcing, and greater leverage of external support

Focus Area	Baseline: December 2007	Target State
1 Infrastructure and Commodity IT Sourcing	In-House Focus	Selective 3rd Party Outsourcing Focus
2 Outsourced Applications Maintenance	Development Focus	Integration and Service Delivery Focus
3 Applications Portfolio Simplification	Multi-Vendor Focus	Dominant Vendor Focus
4 Shared Service Center Process Automation	Legacy Process Focus	Standardized Services Focus
5 Governance Policy and Process Improvement	Vertical Focus	Horizontal Focus

Journey 2
Next Generation IT and the Cloud
(Duration: 24 Months Dec 2010 - Dec 2012)



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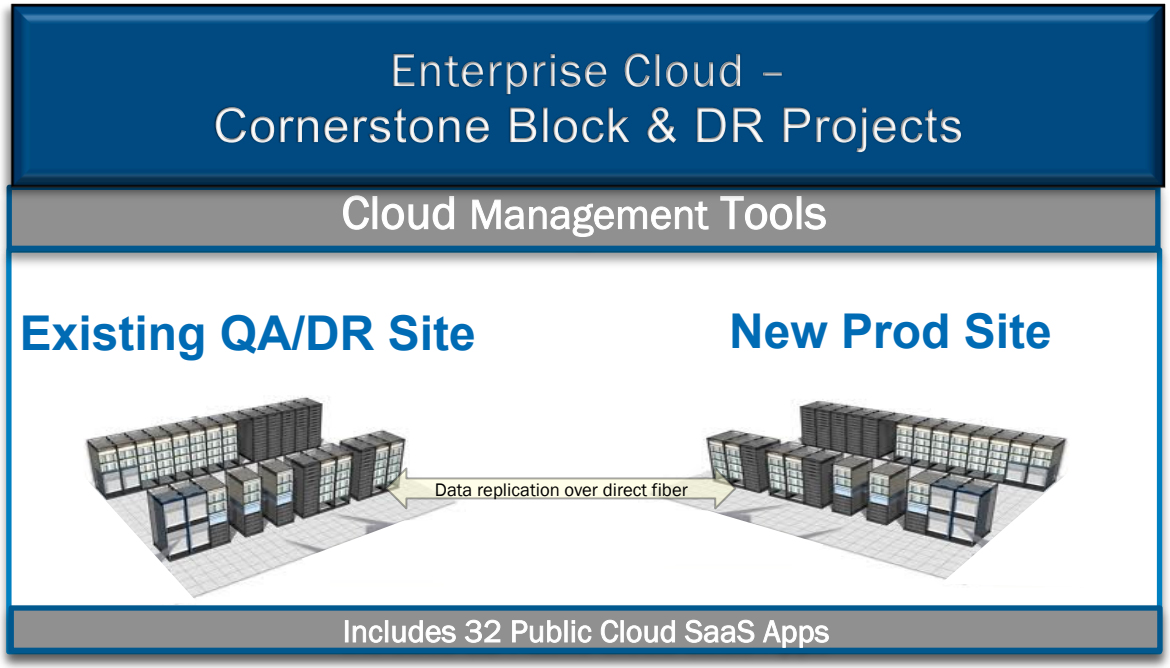
Journey 2
SAIC's Enterprise Cloud



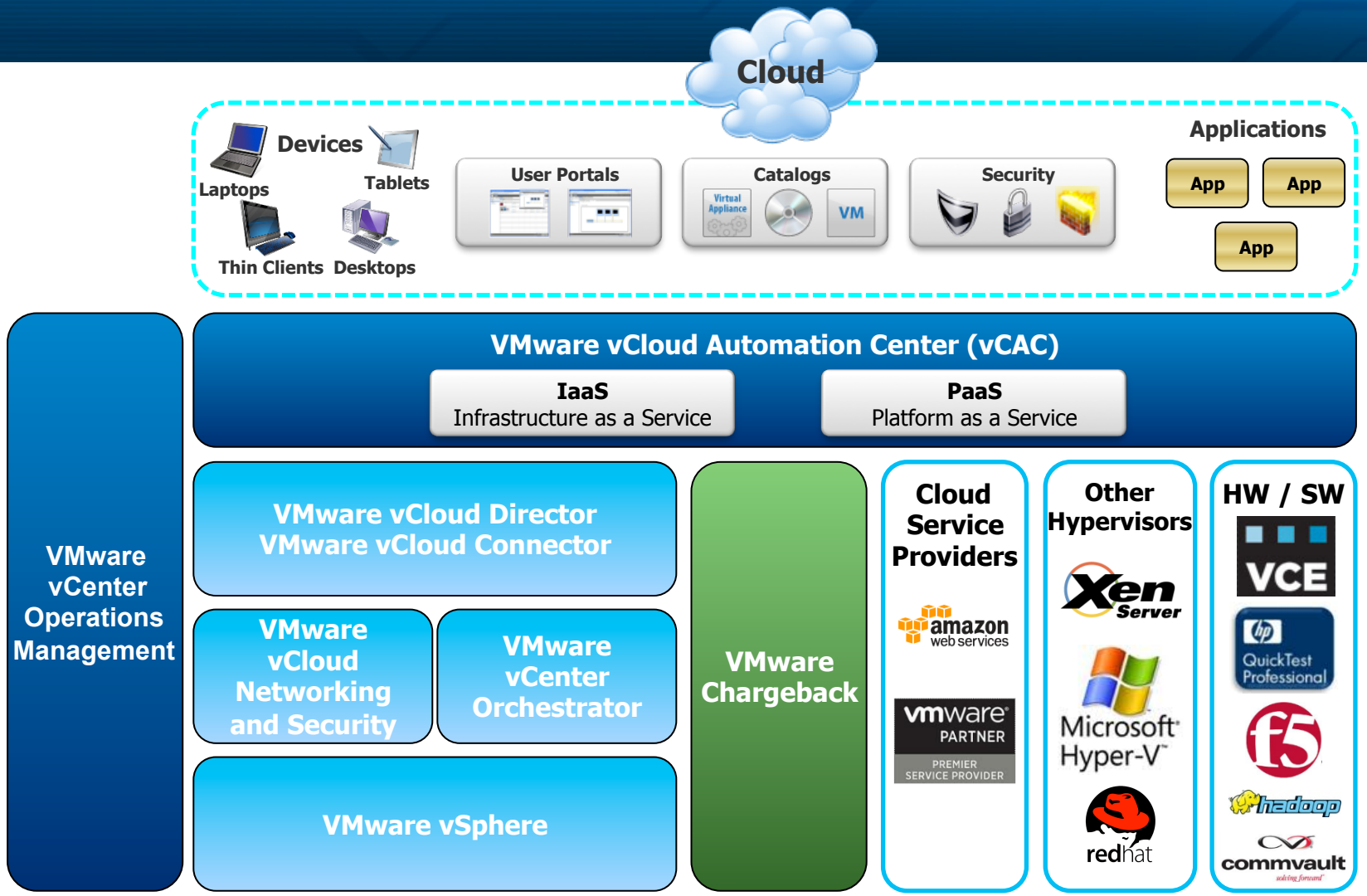
Virtual Desktop Infrastructure

Production Private Cloud

Enterprise Solution Lab

BU Hosting

SAIC's Enterprise Solution Lab



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Top PM Lessons Learned

- Begin with clear support, buy-in and sponsor from top management
- Develop clearly defined end state
- Communicate with all stakeholders early and regularly
- Pay attention to business impact
- Track the critical path, costs, and key milestones closely
- Expect emerging requirements
- Update risks and mitigation registers frequently
- Select vendors early and share the vision
- Apples to apples cost comparisons can be elusive
- Licensing rules may be different within cloud architectures
- Pay attention to SLAs from the cloud provider and your planned SLAs
- Adopt cloud tools during data center consolidation, not after migration to avoid cost surprises
- Focus on knowledge transfer
- Identify an enterprise architect

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Top Technical Lessons Learned

- Start with strategy
- Self-service drives rapid consumption of capacity, size accordingly
- Develop end-state technical roles early
- Develop end-state subject matter expertise
- Integrate key personnel into deployment and migration activities
- Utilize internal personnel to capitalize existing domain knowledge
- Expect hardware and software failures
- Exercise and adapt disaster recovery plans throughout migration lifecycle
- Not all cloud service providers expose a management API
- Decompose the solution into discretely verifiable requirements
- Document everything
- Hold continual reviews – inside out
- Invite creativity
- No sacred cows

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Top Security Considerations for Cloud Computing

- Security fundamentals more relevant than ever.
- Documented security controls and certification.
- Circle of trust is shrinking.
- Security focus is on the data and the instance.
- Consider pre-certifying images for use in cloud environments.
- Disaster recovery is not automatic in the cloud.
- Application architectures and methods are different.
- Consider CSP service level agreements especially with regards to availability, performance and response time. Consider SLAs for private clouds too!
- Not all work loads are appropriate for all cloud solutions.
- Broker multiple resources for unified service management.
- It's everyone's job.

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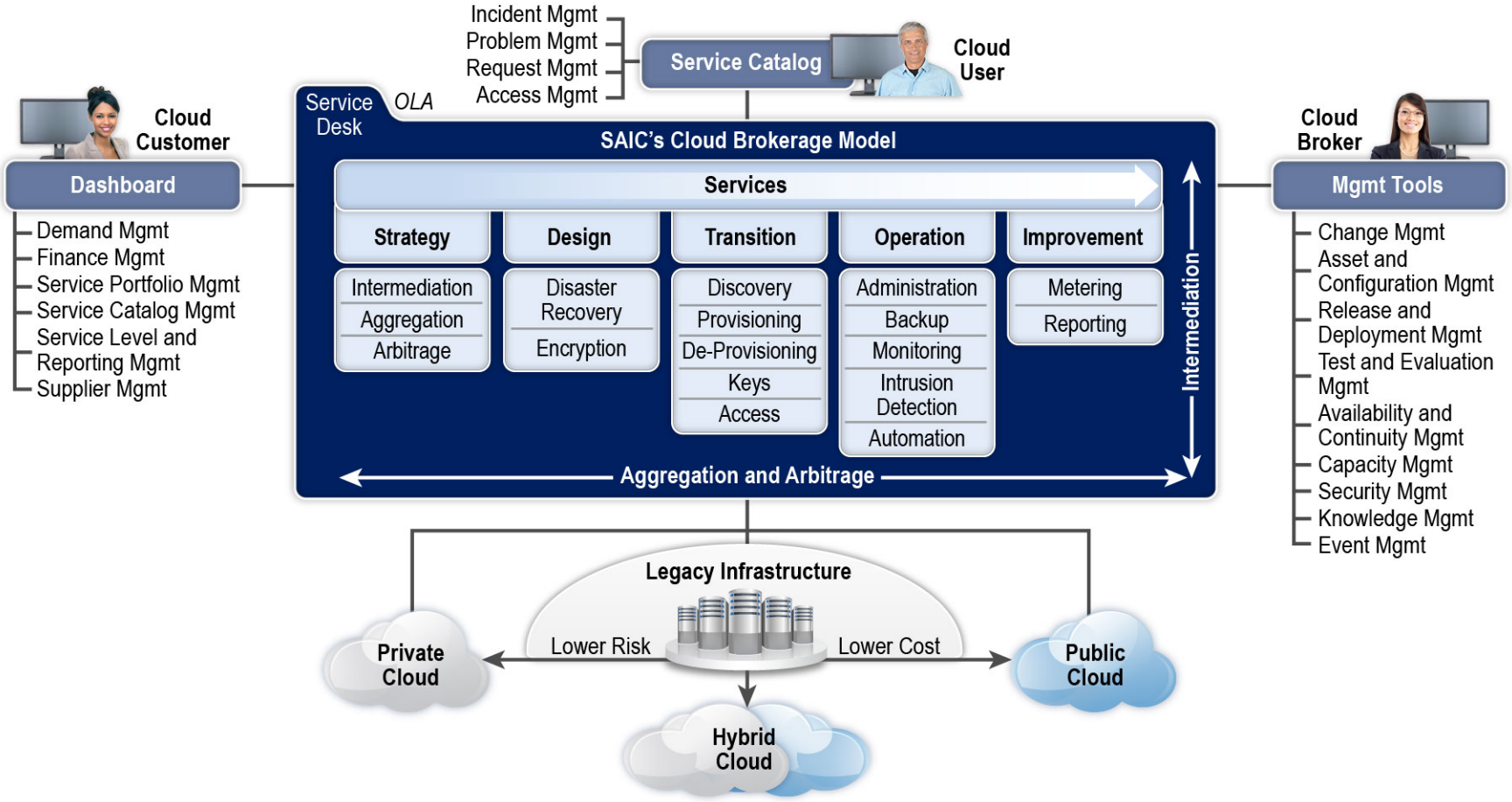
Cloud Management and Governance Framework



Key Workload Considerations

- Vendor support
- Unique requirements
- Licensing model
- Compliance
- Utilization
- How does it scale
- Customer requirements
- Cost structure

- Security requirements
- Privacy requirements
- Cats vs. Cattle
- Run state
- Competencies
- Application Architecture
- Service level requirements

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SAIC's Next Journey
Innovation / Collaboration
(Duration: 24 Months)

Leveraging Cloud Computing in New Ways

- Company separation
- Emerging employment models
- "Democratized innovation" with clients, users and trading partners

Evolving IT Governance Models

- Democratization of the endpoint
- IT architecture informed by emerging services
- Business agility
- Innovation for enterprise
- Competitive advantage

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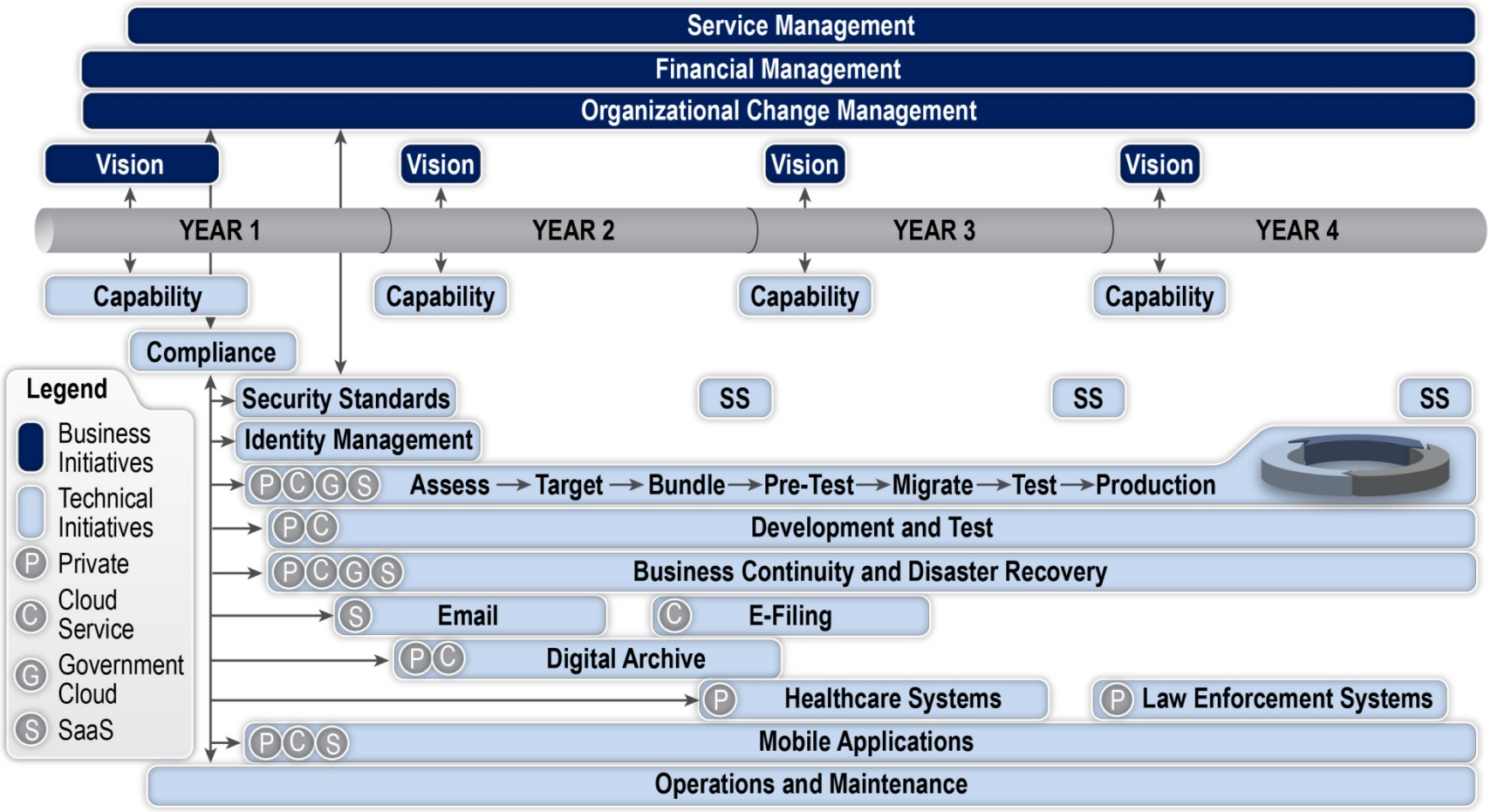
Notional Data Center Consolidation and Cloud Implementation Notional Roadmap



Amazon Web Services Common Use Cases

- Web applications: web application for Licensing, website/ portals, 511, Traffic info sharing, Bus/Subway time
- GIS – Shared GIS data and computing
- Innovative applications/BYOD – water metering, remote monitoring, mobile application extension to enterprise applications
- Test and Development Environments
- Shared Services
- Storage
- Elastic Workloads –scientific analysis to condense turnaround from weeks to hours

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Key Success Factors for Cloud Migrations

- Start with Governance
- Clear Understanding of TCO in Cloud versus on-premise
- Differentiate Managed Services from Infrastructure

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